Arizona Department of Water Resources

System Water Plan Guidance Document

DRAFT

December 14, 2005

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Introduction

Arizona has been affected by drought conditions during most of the last decade. The economic and environmental impacts of drought continue to increase as the population of the state increases. Although Arizona has a reliable water supply by comparison to several of its neighboring states, drought conditions in the rural parts of Arizona have had devastating personal and economic impacts. There is a need for further preparedness in case conditions worsen.

On March 20, 2003 Governor Janet Napolitano issued an executive order and established the Governor's Drought Task Force to address the drought issues facing all Arizonans. As a result of the Governor's Drought Task Force, the *Arizona Drought Preparedness Plan* was developed. Several recommendations were made by the Governor's Drought Task Force and documented in the *Arizona Drought Preparedness Plan*, including that the Governor seek legislative authority for the Arizona Department of Water Resources (ADWR) to require all potable water systems develop a Drought Plan. Based on the Task Force's recommendation, the Drought Plan would include mitigation strategies, including a water conservation plan to reduce vulnerability to drought and response actions. In addition, the Governor's Drought Task Force recommended that legislative authorization be sought for ADWR to require all water systems to provide consistent and coordinated water supply information to ADWR.

Recognizing the need for adequate water planning, the Arizona Legislature passed House Bill 2277 during the 2005 legislative session. House Bill 2277 established a requirement for community water systems to develop and submit a system water plan to ADWR. The development of system water plans is an important step toward improving water resource management planning at both the state and local levels. These plans will allow the state to identify data gaps and gather much needed information. In addition, these plans will allow the state to increase public awareness regarding water supplies, local drought preparedness and response measures, and to promote appropriate statewide conservation practices.

Definitions

"Community Water System" means a public water system that serves at least fifteen service *connections* used by year-round residents of the area served by the system, or that regularly serves at least twenty-five year-round *residents* of the area served by the system. A person is a year-round resident of the area served by a system if the person's primary residence is served water by that system.

"ADWR" means the Arizona Department of Water Resources.

"Large Community Water System" means a community water system that serves water to more than one thousand eight hundred fifty persons.

"Public Water System" means an entity that distributes or sells water and that qualifies as a public water system under Arizona Revised Statute (ARS) §49-352, Subsection B (a water system that provides water for human consumption through pipes or other constructed conveyances and has at least fifteen service connections or regularly serves an average of at least twenty-five persons daily for at least sixty days a year).

"Small Community Water System" means a community water system that does not qualify as a large community water system.

System Water Plan Overview

Each community water system shall prepare and submit to ADWR a system water plan that includes:

a) A Water Supply Plan
b) A Drought Preparedness Plan
c) A Water Conservation Plan

Exemptions:

1) A community water system that has been designated as having an assured water supply, pursuant to ARS §45-576, is exempt from the requirement to submit the water supply plan component of the system water plan. The community water system must still submit the drought preparedness plan and water conservation plan components of the system water plan.

2) A community water system that is regulated as a large municipal provider under ARS §45-561(a municipal provider that supplies 251 acre-feet or more of water for non-irrigation use during a calendar year) is exempt from the requirement to submit the water conservation plan component of the system water plan. The community water system must still submit the water supply plan and drought preparedness plan components of the system water plan.

3) A community water system regulated as a small municipal provider under ARS §45-561 (a municipal provider that supplies 250 acre-feet or less of water for non-irrigation use during a calendar year) is exempt from submitting the water

conservation plan component of the system water plan if the community water system:

a) Petitions ADWR for an exemption prior to January 1, 2007.

b) Demonstrates, under reasonable growth projections, that it will be regulated as a Large Municipal Provider under ARS §45-561 (a municipal provider that supplies 251 acre-feet or more of water for non-irrigation use during a calendar year) prior to January 1, 2012.

4) A Community water system may make a written request to ADWR to be exempted from submitting any information required in the system water plan that has already been submitted to ADWR. ADWR will grant the exemption upon determination that the information is already on file at ADWR.

Submission and Deadlines

Mail or deliver the completed system water plan to:
Susan Craig, Drought Planning Supervisor
Arizona Department of Water Resources
3550 N. Central Ave.
Phoenix, AZ 85012

Large Community Water Systems:
The first system water plan must be submitted to ADWR no later than January 1, 2007, unless filing jointly with another community water system as identified below. An updated plan must be submitted within six months prior to January 1st of every fifth calendar year thereafter (May 31st of 2011, 2015, 2019).

Small Community Water Systems:
The first system water plan must be submitted to ADWR no later than January 1, 2008. An updated plan must be submitted within six months prior to January 1st of every fifth calendar year thereafter (May 31st of 2012, 2016, 2020). An extension for submitting the first system water plan may be granted by ADWR, if a written request from the small community water system is received at least 90 days prior to the filing deadline.

Joint Community Water System Plans and Filings:
Two or more community water systems may coordinate efforts and submit a joint system water plan if the community water systems serve water to residents in the same city or town. The first joint system water plan must be submitted to ADWR no later than January 1, 2008. An updated plan must be submitted within six months prior to January 1st of every fifth calendar year thereafter (May 31st of 2012, 2016, 2020).

Revisions:
If a community water system revises its system water plan after submittal to ADWR, the revised plan must be submitted to ADWR within 60 days from the date of revision.

Plan Review

ADWR must review all system water plans and any subsequent revised plans. ADWR also must notify Community water systems in writing as to whether the system water plan complies with the submission requirements, as outlined below.

a) If the system water plan meets all of the requirements, ADWR will give written notice that the plan complies with the submission requirements. ADWR may determine that the plan meets all of the requirements but recommend changes to improve the plan. In this case, ADWR will provide written notice of the recommended changes, but the water system provider is not required to make the changes.

b) If ADWR determines that a system water plan does not contain or address all of the submission requirements, ADWR will provide written notice of that determination to the community water system. The community water system will have at least 120 days to make any necessary revisions or additions to bring the plan into compliance. If the community water system does not bring the plan into compliance by the date specified in the notice, ADWR will provide notice of the noncompliance to the governing bodies of the cities, towns and counties located within the community water system's service area.

System Water Plan Requirements

Note – 1) ADWR will provide forms that small community water systems may complete and submit to meet the submission requirements of a system water plan.

2) ADWR is aware of the potential security issues involved with submitting maps and is working on addressing the issue. A determination will be made before any system water plans are submitted.

Water Supply Plan:

The water supply plan must evaluate the water supply needs in the service area and propose a strategy to meet identified needs. The water supply plan must include the following information. Some *suggestions* for inclusion are provided in *italic* font under the requirements.

1) A list and description of:
   A. Service area lands
      Provide information such as GIS maps and/or listing of township, range and section information with a description.

   B. Sources of supply, including emergency sources
      Provide water source information such as CAP, Colorado River, groundwater, surface water, effluent or other.

Identify backup supplies by source, such as backup wells, water hauling agreements or connections with other water systems.

C. Well registration numbers and water levels at the well sites (if known)
Provide ADWR well registration numbers for each well used to withdraw water.

Note - The list should not include water levels at well sites that are sources of supply for hard rock mining or metallurgical processing, or industrial uses related to hard rock mining or metallurgical processing.

D. Storage and treatment facilities
Provide information such as number of facilities and the capacity for each facility
For security reasons, it is not necessary to identify location information for storage facilities.

2) A map and description of existing transmission and distribution facilities*

Note – A map is not required for small community water systems
For small community water systems, a map could be submitted to meet the description requirement.

3) Description of:
A. Monthly system production data categorized by the system's sources of supply
A description of monthly system production data in millions of gallons or acre-feet, and categorized by the system's sources of supply. Production data should be based on previous year's data.

B. For systems that use meters to measure withdrawals and diversions:
i. A summary of system average daily demands
ii. Maximum monthly demands
iii. An estimate of peak day demands for the past five years

Note – For systems that are not metered, this requirement (3B) does not apply.

4) A list, description and map of:
A. Existing interconnections*

B. Quantities of water sold to or purchased from other water systems during the previous five years*

Note – A map is not required for small community water systems

For small community water systems, a map could be submitted to meet the description requirement.

Provide information such as:

- *Capacity of interconnect*
- *Volume of water purchased or delivered through interconnect each year (if applicable), and circumstances related to reasons why such water was purchased (lack of supplies, failure of one or more supplies, etc.)*
- *Description of how interconnection agreement can be used to offset loss of, or reductions in water supplies or limitations of such interconnection (e.g. mutual use, one-way use, emergency use only, peak capacity, etc.)*
- *Estimations based on water bills from the previous five years.*

5) An analysis of present and future water supply demands for the next five, ten and twenty years

Provide information such as:

- *Current demand based on either current or previous year*
- *Projection calculations based on:*
  - *Gallons per capita per day (GPCD)*
  - *Gallons per housing unit per day (GPHUD)*
  - *Number of connections and population*
  - *Historic or expected demands*
  - *Land use planning/classification*

*Unless previously provided pursuant to A.R.S. §45-498 which requires that each city, town, private water company and irrigation district in an active management area maintain a current map clearly delineating its service area and distribution system.

Considerations for Developing the Water Supply Plan

In order to determine the impact of drought, the plan should include an inventory of the water supplies currently available, and infrastructure necessary to deliver the water to customers. Water supplies should be viewed from both most probable and worst-case scenarios. A good starting point is to examine flow histories for surface water supplies, particularly with respect to years when the lowest deliveries were reported. An evaluation of worst-case scenarios for well supplies is also important. Consider what would happen if all or a portion of well supplies became unreliable, and how such situations could be mitigated. Assessments of vulnerability to water supply shortages resulting from potential well failures, reductions in surface water supplies, or reductions in well capacities resulting from drought conditions should consider a water system's ability to meet its water system demands during periods of average and peak water demands. When assessing water supplies, it is a good idea to consider unique local conditions that may affect the ability of a water system to obtain reliable quantities of water. The Endangered Species Act is increasingly affecting surface streams throughout the state. As endangered species become more prevalent in stream

reaches, these species needs often compete with the needs of human water users utilizing the same supply. In a time of shortage, it is possible that a court could decide that the endangered species needs take precedence, requiring a water system to leave water in a stream that could otherwise be used for meeting system demands.

Another limitation on supply availability in Arizona is the ban on transferring groundwater supplies between groundwater basins except in certain limited cases. Water systems located on the edge of a groundwater basin boundary may not be able to construct a new well in another basin and transport the additional water. Groundwater basin maps are available at ADWR's Phoenix office.

Drought Preparedness Plan:
The drought preparedness plan must be designed to meet the specific needs of the community water system for which it is developed. The drought preparedness plan must provide the following information. Some *suggestions* for inclusion are provided in *italic* font under the requirements.

1) The name, address and telephone number of the community water system and the names of Officers or other persons responsible for directing operations during a water shortage emergency

   Include identification of person authorized or responsible for initiating and terminating drought stages, and for implementing drought response stages.

2) Drought or emergency response stages that provide for implementation of measures in response to a reduction of water supply resulting from drought or infrastructure failure

   Examples:
   Arizona's Drought Preparedness Plan Example -
   Stage 1 – Normal (Reduce Vulnerability)
   Stage 2 – Abnormally Dry (Raise Consciousness)
   Stage 3 – Moderate (Voluntary Reductions)
   Stage 4 – Severe (Curtailment)
   Stage 5 – Extreme (Eliminate Essential Water Use)

   City Example -
   Stage 1 – Drought Alert
   Stage 2 – Drought Warning
   Stage 3 – Drought Emergency
   Stage 4 – Drought Crisis

   City Example -
   Stage 1 – Mild Drought Conditions
   Stage 2 – Moderate Drought Conditions
   Stage 3 – Severe Drought Conditions
   Stage 4 – Extreme Drought Conditions

Each drought or emergency response stage should include implementation measures for mitigating drought conditions (see 3C below). Two key considerations for each drought stage are "indicators" and "triggers". Indicators are variables that describe drought conditions (e.g. precipitation, stream flow, ground water levels, reservoir levels, soil moisture, palmer indices, etc.) Triggers are specific values of the indicators that initiate and terminate each level or stage of a drought plan and any associated management responses (e.g. When reservoir levels drop to level X, mitigation measures Y and Z will be implemented.)

Drought Stage	***Implementation Measures***	
	For Water System Provider	***For Customers (optional)***
Stage 1 – Normal (Reduce Vulnerability)	▪ *Discourage developers from requiring turf in residential developments* ▪ *Improve infrastructure and storage facilities, if necessary*	▪ *Install low-water use landscaping* ▪ *Repair leaks in irrigation systems*
Stage 2 – Abnormally Dry (Raise Consciousness)	▪ *Communicate conditions, increase outreach and provide conservation tips* ▪ *Increase use of reclaimed effluent for commercial landscaping to reduce potable water supply shortages*	▪ *Fix leaking faucets and replace faulty fixtures* ▪ *Avoid outdoor watering during hottest part of the day*
Stage 3 – Moderate (Voluntary Reductions)	▪ *Provide incentives for water conservation for residences and businesses installing efficient alternative outdoor irrigation* ▪ *Implement water waste ordinances*	▪ *Voluntarily reduce discretionary outdoor water uses* ▪ *Comply with water wasting ordinances*
Stage 4 – Severe (Curtailment)	▪ *Implement time of day/day of week schedules* ▪ *Impose restrictions on fire and fireworks*	▪ *Comply with time of day/day of week outdoor watering restrictions* ▪ *Use covers to reduce evaporation from pools*
Stage 5 – Extreme (Eliminate Essential Water Use)	▪ *Eliminate outdoor watering* ▪ *Prohibit all public water uses not required for health or safety and publicize enforcement activities to customers*	▪ *Eliminate outdoor watering* ▪ *Reuse water (dishwater, shower water, poll back wash)*

3) A plan of action that the community water system will take to respond to drought or water shortage conditions, including:
   A) Provisions to actively inform the public of the water supply shortage and a program for continued education and information regarding implementation of the drought preparedness plan
      Public education programs regarding water supply shortages and implementation of the drought preparedness plan.

   B) Development of emergency supplies, which may include identification of emergency or redundant facilities to withdraw, divert or transport substitute supplies of the same or other types of water
      Maximum should be the same as backup supplies identified in the water supply plan.

   C) Specific water supply or water demand management measures for each stage of drought or water shortage conditions

      Note – 1) Measures are subject to approval by the Arizona Corporation Commission if the community water system is a public service corporation.
      2) This requirement may be met by providing a curtailment tariff on file with the Arizona Corporation Commission.

      See example implementation measures for drought stages in the table above.

Considerations for Developing the Drought Preparedness Plan
The drought plan should compare available worst-case supplies to expected demands. This will help approximate how much water demand would need to be reduced in the event of drought. In addition to assessing average day demand, also assess peak day and peak hour demand. It is possible that a water system can supply average day demand, even without all of its wells if there is a sufficient storage system in place, however peak day and hour demands may drain storage tanks faster than wells can refill them.

Water systems should define appropriate ways to reduce water demands when deemed necessary to meet available supplies. Some typical examples include reducing landscape irrigation by both residential and non-residential users, and offering water use audits to customers.

<u>Water Conservation Plan</u>:
The water conservation plan must be designed to increase the community water system's efficiency, reduce waste and encourage consumer conservation efforts. The water conservation plan must also be designed to meet the specific needs of the community water system and include both demand and supply management measures.

Some *suggestions* for inclusion are provided in *italic* font under the specific requirements; however, the following information must be included.

1) Feasible measures that may be implemented to determine and control lost and unaccounted for water

2) Consideration of water rate structures that encourage efficient use of water, as set by the community water system's governing body

   Note – Subject to approval by the Arizona Corporation Commission, if the community water system is a public service corporation.

   Provide information such as:
   - *Existing rate structure information (e.g. rate per usage amount, dollars per 1,000 gallons, etc.) that serves as a conservation incentive (e.g. increasing block rates, seasonal rates, target billing, excessive use rates, etc.)*
   - *Plans to institute conservation incentive rate structures if they are not already in use*
   - *Any education/outreach efforts tied to acceptance of incentive rates (e.g. workshops, etc.)*

3) A continuing conservation education program that contains provisions to actively inform the public of drought conditions and information regarding conservation measures to reduce vulnerability from drought conditions, including:
   A) Curtailment of nonessential water uses
   B) Affordable efficiency technologies for indoor and outdoor use
   C) Rebate and retrofit programs for indoor and outdoor uses
   D) Reuse and recycling programs

   Provide information such as:
   - *A description of general education and outreach efforts (pamphlets, workshops, etc.) that focus on standard conservation measures and increased efforts to be implemented during various stages of drought*
   - *A description of teacher and student based education for water conservation and drought*
   - *A description of acceptable levels of discretionary use reduction to include time of day, day of week recommendations, water waste ordinances, landscape water restrictions, etc.*
   - *Descriptions of programs tied to retrofit or replacement of old and inefficient fixtures with best available, water efficient technologies*
   - *Existing or planned programs that encourage or require the reuse or recycling of water - description should include any incentives provided*
   - *Existing and/or planned curtailment plans to include stages and associated tariffs*

Note - A community water system must start implementing the water conservation plan within twelve-months after receiving written notification from ADWR that the plan is in compliance with submission requirements.

Considerations for Developing the Water Conservation Plan
When developing a water conservation plan for a community water system, it is important to include a balance of conservation measures and incentives. Conservation measures should include both demand and supply side programs. Education programs tied to water conservation should be a cornerstone to planning efforts. Proper use of water conservation programs can extend the life of existing infrastructure and can delay the costs associated with building new wastewater treatment facilities.

If a community water system does not already have a water conservation plan or is amending an existing plan, consider defining water conservation goals. If estimates of annual water supply, service connections, water demand, daily average and peak demands, current-pricing structures, and any contingency plans (e.g. drought, emergency, etc.) are included, developing a water system profile that defines the service area characteristics is helpful. It might also be beneficial to consider developing a demand forecast for the next five and ten-year period to project future water use. The method that was followed to forecast future water use should be stated (e.g. per capita or per connection approach).

Water conservation plans should also clearly identify existing or planned conservation measures and incentives. Based on the size of the system, the most feasible measure should be selected, in terms of initial cost, payback and ease of implementation. Some measures to consider based on the size of the community water system include the following:

a) For small community water systems, consider: universal metering, loss and unaccounted for water measures, conservation incentive rates and/or information and education/outreach.

b) For medium community water systems, consider: water use audits, retrofit programs, education and outreach programs, system pressure management evaluations and/or efficiency requirements for landscape water use.

c) For large community water systems, consider: fixture replacement and promotional efforts, reuse and recycling programs, water use regulations and/or integrated resource management (water conservation achieved with conservation of other resources such as energy), education programs for teachers, students, and the community as a whole.

To complete a basic water conservation plan, consider developing an implementation strategy for conservation measures and include an evaluation component.

There are many more advanced planning steps that can be included in a water conservation plan; however, these basic guidelines are intended to provide a starting point. There is no “one size fits all” approach to conservation; however, most conservation plans contain many of the components suggested herein. The overall water system characteristics of the community should help to determine the

components for a local water conservation plan and also provide the basis for future planning efforts.

Assistance

ADWR is pleased to offer assistance in the development of a system water plan. A checklist is provided in Appendix A to assist community water system providers in submitting a system water plan that meets all of the submission requirements. For questions or comments, please contact Susan Craig, Drought Planning Supervisor at (602) 771-8533 or smcraig@azwater.gov. Marjie Risk, Statewide Water Conservation Supervisor, may also be contacted to help with the water conservation plan portion of the system water plan at (602) 771-8422 or mlrisk@azwater.gov.

Appendix A - Checklist

This checklist is provided to assist community water system providers in submitting a system water plan that meets all submission requirements. Complete and submit the following items and supply the requested information.

Water Supply Plan

- ☐ A list and description of service area lands
- ☐ A list and description of sources of supply, including emergency sources
- ☐ A list and description of well registration numbers and water levels at the well sites (if known)
- ☐ A list and description of storage and treatment facilities
- ☐ A map and description of existing transmission and distribution facilities*
- ☐ Description of monthly system production data categorized by the system's sources of supply
  - For systems that use meters to measure withdrawals and diversions:
    - ☐ A summary of system average daily demands
    - ☐ Maximum monthly demands
    - ☐ An estimate of peak day demands for the past five years
- ☐ A list, description and map of existing interconnections**
- ☐ A list, description and map of quantities of water sold to or purchased from other water systems during the previous five years**
- ☐ An analysis of present and future water supply demands for the next five, ten and twenty years

* A map is not required for small community water systems

**Unless previously provided pursuant to A.R.S. §45-498 which requires that each city, town, private water company and irrigation district in an active management area maintain a current map clearly delineating its service area and distribution system.

Drought Preparedness Plan

- ☐ The name, address and telephone number of the community water system and the names of Officers or other persons responsible for directing operations during a water shortage emergency
- ☐ Drought or emergency response stages that provide for implementation of measures in response to a reduction of water supply resulting from drought or infrastructure failure
- ☐ A plan of action that the community water system will take to respond to drought or water shortage conditions, including:
  - ☐ Provisions to actively inform the public of the water supply shortage and a program for continued education and information regarding implementation of the drought preparedness plan

- ☐ Development of emergency supplies, which may include identification of emergency or redundant facilities to withdraw, divert or transport substitute supplies of the same or other types of water
- ☐ Specific water supply or water demand management measures for each stage of drought or water shortage conditions

Water Conservation Plan

- ☐ Feasible measures that may be implemented to determine and control lost and unaccounted for water
- ☐ Consideration of water rate structures that encourage efficient use of water, as set by the community water system's governing body
- ☐ A continuing conservation education program that contains provisions to actively inform the public of drought conditions and information regarding conservation measures to reduce vulnerability from drought conditions, including:
  - ☐ Curtailment of nonessential water uses
  - ☐ Affordable efficiency technologies for indoor and outdoor use
  - ☐ Rebate and retrofit programs for indoor and outdoor uses
  - ☐ Reuse and recycling programs

Combine the information requested above. This is a complete system water plan.